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him, he does his duty; if left without employment from others, he finds out work for himself; he runs a laundry; he fishes; he peddles vegetables; he hunts up rags and bones; he turns gardener, choosing all the little valleys between the sand hills, irrigating them, and raising large crops where the white man raised nothing; all the time serenely confident that as long as his prices are lowest, he will find plenty of customers, some of the best of them among the very men who shout so loudly "the Chinese must go." Truly, unless the government promptly pass some law to restrain the Chinamen from free access to these shores, the poor white man even if sober and industrious, will soon find life growing very hard, for what chance has he, with his ideas of comparative luxury in house, food and clothing, probably a wife and family, and often some intellectual tastes also, against a rival who lives in an unfloored hut, feeds on rice, stuffs his blouse with hay when the weather is cold, has only himself to keep, and never troubles his head about literature, science, or politics, yet all the time keeps a keen eye on the main chance, earning and keeping every cent he can, and scarcely ever resting from labor except for the needful sleep.

Note.—In my last paper I referred the Planorboid shell found in Mountain lake, S. F., to the genus *Helisoma*, but I find it to be a genuine Planorbis. The tiny little flat shell from the same pond is *Menetus opercularis*. Prof. Verrill has informed me that the small starfish mentioned as probably new is the *Asterias equalis* of Stimpson. It is rare and local in this neighborhood.

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SOME CHARACTERISTICS OF THE CENTRAL ZOÖ- GEOGRAPHICAL PROVINCE OF THE UNITED STATES.¹

BY A. S. PACKARD, JR.

IN recent studies on the extent of the native breeding places of the Rocky Mountain locust, my attention, while in the field and afterwards in working up some of the results then obtained, has been directed to some of the faunal characteristics of the Central province; my own observations bearing especially on the distribution of certain insects and especially the Phyllopod Crustacea, whose distribution west of the Mississippi presents some points of considerable interest.

¹ Read at the last April meeting of the National Academy of Sciences, Washington.

The first attempt to divide the United States as a whole into zoölogical provinces was in 1859, by Dr. LeConte, in his "Coleoptera of Kansas and Eastern New Mexico (Smithsonian Contributions, 1859)." He divided the Coleopterous fauna of the United States into three great zoölogical districts, distinguished each by numerous peculiar genera and species, which, with but few exceptions, do not extend into the contiguous districts. He named them the Eastern, Central and Western divisions; so that to him is due the credit of first distinguishing the Central province.

In 1866, Prof. Baird,¹ from a study of the avifauna of the United States, concluded that "the ornithological provinces of North America consist of two great divisions of nearly equal size in the United States, meeting in the vicinity of the 100th meridian, the western half divisible again into two, more closely related to each other than to the eastern, though each has special characters. These three sections form three great provinces to be known as the western, middle and eastern; or those of the Pacific slope; of the great basin, the Rocky mountains and the adjacent plains; and of the fertile plains and region generally, east of the Missouri."

In 1871, Mr. J. A. Allen,² divided the avifauna of the United States into two provinces, the eastern and western, the latter embracing the Pacific coast. (Since this paper was read Mr. Allen's late essay has appeared, in which he adopts Prof. Baird's division into three provinces. The geographical distribution of the mammalia, etc. Bulletin of Hayden's U. S. Geographical and Geological Survey of the Territories, May 3, 1878).

In 1873,³ Mr. W. G. Binney published a map of the distribution of our land shells, dividing the molluscan fauna into the Eastern, Central and Pacific provinces.

In 1875, Prof. E. D. Cope in his check list of North American Batrachia and Reptilia⁴ divided the Nearctic realm of Sclater into the Austroriparian, Eastern, Central, Pacific, Sonoran and Lower Californian regions. He remarks that "the Pacific region is nearly related to the Central, and, as it consists of only the narrow district west of the Sierra Nevada, might be regarded as a sub-divi-

¹ American Journal of Science and Arts, January and March, 1866.

² Bulletin of the Museum of Comp. Zoology, April, 1871.

³ Catalogue of the Terrestrial Molluscs of North America.

⁴ Bulletin U. S. Nat. Mus., Washington, 1875. Bull. Mus. Comp. Zool., 1873.

sion of it. It, however, lacks the mammalian genera *Bos* and *Antilocapra*, and possesses certain peculiar genera of birds, as *Geococcyx*, *Chamæa* and *Oreortyx*. . . . There are some genera of reptiles, *e. g.* *Charina*, related to the Boas, *Lodia*, *Aniella*, *Gerrhonotus* and *Xantusia*, which do not occur in the central sub-region. There are three characteristic genera of Batrachia, all Salamanders, viz: *Anaides*, *Batrachoseps* and *Dicamptodon*; while the eastern genera *Plethodon* and *Diemyctylus* reappear after skipping the entire central district." Cope adds that "the fresh-water fish fauna is much like that of the central district in being poor in types." Cope's Sonoran region is evidently a northward extension of the Mexican fauna, which sends its outliers into southern Arizona, Utah and New Mexico, and is not to be taken into account in discussing the faunal provinces of the United States alone.

In 1876, Wallace in his "Geographical Distribution of Animals," divided the Nearctic region into four sub-regions, viz: the Californian, Central or Rocky mountain, Alleghanian and Canadian. His Central sub-region extended to Lat. 25° N.

It will be seen from this review that by general consent the fauna of the Pacific slope is on the whole regarded as belonging to a separate province from that of the Rocky Mountain plateau, whether we regard the mammals, birds, reptiles, amphibia, Coleoptera or land shells.

Botanically, as observed by those who have traveled across the plains to California, the flora of the great plains is quite different from that of the Eastern States, and the Pacific flora is as distinct from the central flora. This has been clearly shown by Sir J. D. Hooker and Prof. Asa Gray in their preliminary notices of the results of their botanical researches in connection with Dr. Hayden's U. S. Geological Survey of the Territories.

In traveling last summer, in pursuance of the work of the U. S. Entomological Commission, I passed rapidly over a large area of the Central province lying north of the fortieth parallel, including Colorado, Wyoming, Northern Utah, Western Idaho, Central and Northern Montana, and was thus enabled to observe in a superficial way the general features of the flora and fauna nearly up to the British line. I was impressed with the resemblance of Central and Northern Montana to Northern Utah, the insect-fauna being apparently nearly identical. Doubtless this insect-fauna extends

northwards into the Upper Saskatchewan valley as far as the southern limit of trees, there being much less intermixture with Canadian forms than might be expected. Then crossing the Sierra Nevada, and going overland to Oregon, I was able to trace the gradual passage of the Californian insect-fauna into the Oregonian, with some Canadian forms; and by passing up the Columbia river to Wallula, here as well as at Reno in Nevada, to perceive the great differences between the fauna of the Pacific slope and that of the plains and deserts of the Central province.

In briefly reviewing the different orders of insects, other than Coleoptera, which have been so fully elaborated by Dr. LeConte, and certain groups of Crustacea, we will begin with the *Hymenoptera*, and point out a few characteristics distinguishing the Central from the Pacific provinces. In 1865 and 1866 a large number of Coloradian fossorial Hymenoptera passed under the writer's hands, Mr. Cresson having previously described from this material a large number of Coloradian Hymenoptera of all families. The richness of the hymenopterous fauna of Colorado struck me, and I was impressed with its distinctness from that of the Eastern States. I have seen few of these forms from California. Among the family of ants (*Formicidæ*), there is one form characteristic of the plains which does not occur on the Pacific slope. This is the *Pogonomyrmex occidentalis* (Cress). I have seen its large hills at Brookville, Kansas, and observed them in Colorado and Utah and in Reno, at the base of the Sierra Nevada, but not west of that point. It ranges, according to Mayer, south into New Mexico, and San Luis valley, Colorado. Its nest forming large elevations in cleared spaces sometimes six or eight feet in diameter, is one of the characteristic sights on the plains.

Among the *Lepidoptera*, family *Bombycidæ*, there are several forms peculiar to the central district, notably the genus *Dirphia* (Coloradia), *Euleucophæus*, *Gloveria* (*Mesistesoma*), *Hemileuca Funo* and *Hera*, and *Platysamia gloverii*. The family is feebly represented in the Central province, but richly so by numerous species on the Pacific slope, which do not appear east of the Sierra Nevada.

The *Phalænidæ*, or geometric moths, are richly developed in the Pacific province, and but poorly in the Central province, owing to the absence of deciduous trees; of those found in the latter some occur west of the Sierra Nevada, and some are peculiar to the plains and Rocky mountains.

Of the *Orthoptera* there is a large number of species peculiar to the plains which I did not observe in the Pacific States; of these, *Caloptenus spretus* is thoroughly characteristic of the Central province. It does not occur in the Pacific and only breeds temporarily in the Eastern province, and its natural limits define well those of the province itself. It ranges up to lat. 53° N. on the North Saskatchewan and south to Southern Utah and Colorado. The exact limits of its distribution are given in the First Annual Report of the U. S. Entomological Commission.

While we are still ignorant of the distribution of insect life between the hundredth meridian and the Pacific ocean, there seems good reason, from what we do know, and from the great differences in the flora, and the soil and climate, especially the rainfall east and west of the Sierra Nevada, to regard this lofty range as the general point of separation defining two grand zoölogical provinces. Many groups of insects abounding west of the mountains do not occur east, except in isolated cases. Of a number of Myriopods found on the Pacific coast none occur east, and so of the Arachnida so far as known, and Dr. Thorell, who has worked up some of the spiders of Colorado, was struck by the general similarity of some forms to those occurring in the plateau of North-eastern Asia. Among the insects there are a few Pacific forms which closely resemble European species, and which are not represented east of the Sierra Nevada. It should be borne in mind, however, that the Sierra Nevada does not present an absolute barrier, as a considerable number of species occur on each side of it, and it is well known that the Rocky Mountains are but a slight barrier to the distribution of the animals on either side, the fauna of Colorado, Northern Utah, Wyoming, Montana and Idaho being quite homogeneous, and the fauna of these Territories the same on each side of the high mountain ranges traversing them.

Among the fresh-water Crustacea the *Astaci* of the Pacific slope, as is well known, belong to the European genus *Astacus*, those east of the Sierra Nevada to the genus *Cambarus*, which is so richly developed in the Eastern provinces, especially in the Mississippi valley.

The distribution of the fresh-water *Phyllopoda* is of peculiar interest. The family *Apodidae* is restricted to the Central province: none are found in the Mississippi valley, and none in Cali-

fornia. Of the four species of *Apus* all inhabit the Central province; *Apus æqualis* lives on the plains of the Rocky mountains, and also at Matamoras, in Mexico. It is a curious fact that *Apus lucasani* Pack., not only occurs at Cape St. Lucas, Lower California, but is also an abundant species at Ellis, Kansas. This is a parallel case to the presence of certain birds at Cape St. Lucas which, as observed by Prof. Baird, belong to the Central rather than to the Pacific province. Of the genus *Lepidurus* there are two forms (*L. couesii* and *L. bilobatus*) characterizing the plains. *L. couesii* occurs in Northern Montana, and is allied to a recently described *Lepidurus* from Archangel, Russia, according to Lilljeborg.

The eastern limits of the Central province extend to near the 97th meridian in Kansas and Nebraska, according to the writer's observations.

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THE REPORT OF THE COMMITTEE OF THE AMERICAN ASSOCIATION OF 1876 ON BIOLOGICAL NOMENCLATURE.

BY E. D. COPE.

IN the year 1842 the British Association for the Advancement of Science took into consideration the question of zoölogical nomenclature, and through a committee made a report, which embodies a series of recommendations in the form of rules. In 1863 another committee of the British Association revised these rules and reprinted them with various additional recommendations. This report was republished in this country with a few additional suggestive notes by Prof. A. E. Verrill, in 1869.¹ Since that date the question has been discussed by the American entomologists Scudder, Edwards and LeConte.

The rules issued at the earlier periods above mentioned dealt largely with etymological and literary questions, while admitting in general terms the necessity of observing the law of priority of date. The energy of some of the resurrectionists of obsolete works in bringing to light old names, however, soon drew attention to the importance of ascertaining the real nature of priority of date; and the close coincidence of date of some modern publications, has brought up the question from another side. The

¹ Amer. Jour. Sci. and Arts, July.